

## WHAT IS CLAIMED IS:

1. A radio antenna apparatus comprising an antenna connected with a radio communication circuit that transmits and receives a radio signal, said radio antenna apparatus comprising:

5 a parasitic element;

a load impedance element connected between said parasitic element and a ground of a housing of a radio communication apparatus including the radio communication circuit; and

a controller for controlling an element value of said load impedance element so as to set a current flowing on said housing to be equal to or smaller than a predetermined value when said radio communication apparatus transmits the radio signal, thereby controlling a specific absorption rate (SAR) to be equal to or smaller than a predetermined value.

15 2. A radio antenna apparatus comprising:

a first antenna;

a second antenna;

a switch device for switching over so as to connect said second antenna to a ground of a housing of a radio communication apparatus including a radio communication circuit, that is provided in said radio communication apparatus and transmits and receives a radio signal, through a load impedance element when said first antenna is connected with the radio communication circuit, and so as to connect said first antenna to the ground of said housing through said load impedance element when said second antenna is connected with the radio

communication circuit that transmits and receives the radio signal; and a controller for controlling an element value of said load impedance element so as to set a current flowing on said housing to be

equal to or smaller than a predetermined value when said radio communication apparatus transmits the radio signal, thereby controlling a specific absorption rate (SAR) to be equal to or smaller than a predetermined value.

5           3. The radio antenna apparatus as claimed in claim 1, further comprising a storage device for storing, as a table, the element value of said load impedance element at which the current flowing on said housing is equal to or smaller than the predetermined value when said radio communication apparatus transmits the radio signal,

10           wherein said controller controls the element value of said load impedance element with reference to the table stored in said storage device.

          4. The radio antenna apparatus as claimed in claim 1, further comprising a storage device for storing, for each predetermined frequency  
15 as a table, the element value of said load impedance element at which the current flowing on said housing is equal to or smaller than the predetermined value when said radio communication apparatus transmits the radio signal,

          wherein said controller controls the element value of said load  
20 impedance element with reference to the table stored in said storage device, based on a communication frequency of said radio communication apparatus.

          5. The radio antenna apparatus as claimed in claim 1, further comprising a measurement device for measuring the current flowing on  
25 said housing when said radio communication apparatus transmits the radio signal,

          wherein said controller controls the element value of said load impedance element so as to set the current flowing on said housing to be

equal to or smaller than the predetermined value based on said measured current.

6. The radio antenna apparatus as claimed in claim 1,  
wherein said load impedance element comprises:

5 a plurality of impedance elements respectively having element  
values different from each other; and

a switching device for changing the element value of said load  
impedance element by selectively changing over one of said plurality of  
impedance elements.

10 7. The radio antenna apparatus as claimed in claim 1,  
wherein said load impedance element comprises an impedance  
element capable of changing the element value, an element value of the  
impedance element capable of changing said element value being changed  
thereby changing the element value of said load impedance element.

15 8. The radio antenna apparatus as claimed in claim 1,  
wherein said load impedance element comprises an impedance  
circuit that includes a variable capacitance diode, a reverse bias voltage  
applied to said variable capacitance diode being changed so as to change  
an impedance of said impedance circuit, thereby changing the element  
20 value of said load impedance element.

9. The radio antenna apparatus as claimed in claim 1, further  
comprising a human body proximity sensor for detecting that a human  
body is in proximity to the housing of said radio communication  
apparatus,

25 wherein the element value of said load impedance element is  
controlled as to set the current flowing on said housing to be equal to or  
smaller than the predetermined value when said human proximity sensor  
detects that the human body is in proximity to said radio communication

apparatus and said radio communication apparatus transmits the radio signal.

10. The radio antenna apparatus as claimed in claim 1, further comprising:

5 a human body proximity sensor for detecting that a human body is in proximity to the housing of said radio communication apparatus; and

a temperature sensor for measuring a body temperature when the human body contacts with the housing of said radio communication apparatus,

10 wherein the element value of said load impedance element is controlled so as to set the current flowing on said housing to be equal to or smaller than the predetermined value, when the body temperature measured by said temperature sensor is equal to or higher than a predetermined value, said human proximity sensor detects that the  
15 human body is in proximity to said radio communication apparatus, and said radio communication apparatus transmits the radio signal.

11. The radio antenna apparatus as claimed in claim 1, further comprising:

a human body proximity sensor for detecting that a human body is  
20 in proximity to the housing of said radio communication apparatus; and

a touch sensor for measuring a stress when the human body contacts with the housing of said radio communication apparatus,

wherein the element value of said load impedance element is controlled so as to set the current flowing on said housing to be equal to  
25 or smaller than the predetermined value, when the stress measured by said touch sensor is equal to or larger than a predetermined value, said human proximity sensor detects that the human body is in proximity to said radio communication apparatus, and said radio communication

apparatus transmits the radio signal.

12. The radio antenna apparatus as claimed in claim 1, further comprising:

5 a human body proximity sensor for detecting that a human body is in proximity to the housing of said radio communication apparatus;

a touch sensor for measuring a stress when the human body contacts with the housing of said radio communication apparatus; and

10 a temperature sensor for measuring a body temperature when the human body contacts with the housing of said radio communication apparatus,

wherein the element value of said load impedance element is controlled so as to set the current flowing on said housing to be equal to or smaller than the predetermined value, when the body temperature measured by said temperature sensor is equal to or higher than a  
15 predetermined value, the stress measured by said touch sensor is equal to or larger than a predetermined value, said human proximity sensor detects that the human body is in proximity to said radio communication apparatus, and said radio communication apparatus transmits the radio signal.

20 13. The radio antenna apparatus as claimed in claim 1, wherein said antenna is either one of a monopole antenna and a helical antenna, and

wherein said parasitic element is an electrical conductor plate.

25 14. The radio antenna apparatus as claimed in claim 2, wherein said first antenna is either one of a monopole antenna and a helical antenna, and

wherein said second antenna is a plane antenna or an inverse F antenna.

15. A radio communication apparatus comprising:

a radio antenna apparatus including an antenna connected with a radio communication circuit that transmits and receives a radio signal; and

5 a radio communication circuit, operatively connected with said antenna, for transmitting and receiving a radio signal,

wherein said radio antenna apparatus comprises:

a parasitic element;

10 a load impedance element connected between said parasitic element and a ground of a housing of the radio communication apparatus including the radio communication circuit; and

a controller for controlling an element value of said load impedance element so as to set a current flowing on said housing to be equal to or smaller than a predetermined value when said radio  
15 communication apparatus transmits the radio signal, thereby controlling a specific absorption rate (SAR) to be equal to or smaller than a predetermined value.

16. The radio communication apparatus as claimed in claim 15, wherein said radio communication apparatus is a portable radio  
20 communication apparatus.

17. A radio communication apparatus comprising:

a radio antenna apparatus including first and second antennas; and

25 a radio communication circuit, operatively connected with either one of said first antenna and said second antenna, for transmitting and receiving a radio signal,

wherein the radio antenna apparatus further comprises:

a switch device for switching over so as to connect said second

- antenna to a ground of a housing of the radio communication apparatus including the radio communication circuit, that is provided in said radio communication apparatus and transmits and receives a radio signal, through a load impedance element when said first antenna is connected with the radio communication circuit, and so as to connect said first antenna to the ground of said housing through said load impedance element when said second antenna is connected with the radio communication circuit that transmits and receives the radio signal; and a controller for controlling an element value of said load impedance element so as to set a current flowing on said housing to be equal to or smaller than a predetermined value when said radio communication apparatus transmits the radio signal, thereby controlling a specific absorption rate (SAR) to be equal to or smaller than a predetermined value.
18. The radio communication apparatus as claimed in claim 17, wherein said radio communication apparatus is a portable radio communication apparatus.